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The American Fertilizer

Vol. 100 MAY 6, 1944 No. 9

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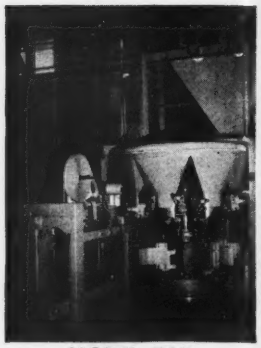

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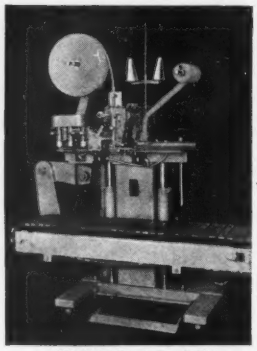

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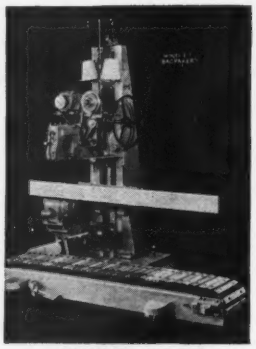

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See page 23

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AMERICAN FERTILIZER

"That man is a benefactor to his race who makes two blades of grass to grow where but one grew before."

Vol. 100 MAY 6, 1944 No. 9

A Comparison of Colloidal Phosphate, Rock Phosphate and Superphosphate as Sources of Phosphorous for Potato Fertilizer in Aroostook County, Maine

By Bailey E. Brown[1] and Arthur Hawkins[2]

Introduction

FERTILIZER studies conducted in Aroostook County, Maine, by the Maine Agricultural Experiment Station, in cooperation with the United States Department of Agriculture, afford definite proof of the need of phosphorus in potato fertilizers. In some early fertilizer studies with the Irish Cobbler variety it was found that a fertilizer containing no phosphorus, a 4–0–5 mixture applied at the rate of 1,800 pounds to the acre, gave a yield of 140 bushels per acre, whereas a complete fertilizer, 4–6–5, applied at the same rate per acre, produced 267 bushels per acre. Obviously, the difference of 127 bushels in favor of the phosphorus-containing fertilizer over the one without phosphorus is markedly significant. In later studies on the Aroostook Experiment Farm, with the Green Mountain variety, as reported by Chucka, Hawkins, and Brown[3] in Maine Station Bulletin No. 414, the omission of phophorus (4–0–8) in comparison with a complete fertilizer (4–8–7) resulted in an average reduction in yield for a 12-year period of 103 bushels per acre. Not only has it been found essential to maximum potato production in Aroostook County that phosphorus be a constituent of potato fertilizers, but it has been found equally important that this element should be derived from a water-soluble source. The standard practice long employed in Aroostook County where complete fertilizers are commercially used is to use a water-soluble source of phosphorus.

Object of Investigation and Materials Tested

Several years ago the writers carried on some phosphate studies to determine the influence of both available and unavailable phosphates on potato yields. Some collateral information was also secured relative to the effect of the phosphorus sources on vine and tuber development. Four fertilizer treatments were employed, all made up on a 4–8–7 basis. The same nitrogen and potash compounds[4] were used in all mixtures. The phosphates compared were: Superphosphate (20 per cent P_2O_5), colloidal phosphate (18.9 per cent P_2O_5)[5], and Tennessee brown-rock phosphate (33 per cent P_2O_5). All phosphates were supplied in the mixtures on the basis of total P_2O_5 content.

To each fertilizer mixture calcined Kieserite was added at the rate of about 95 pounds per ton of fertilizer as an insurance against a

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[3]Chucka, Jos. A.; Hawkins, Arthur; and Brown, Bailey E., "Potato Fertilizer-Rotation Studies on Aroostook Farm—1927 to 1941" (In cooperation with the U. S. Department of Agriculture), Maine Agr. Expt. Sta. Bul. 414 (1943). Illus.

[4]Twenty-five per cent of the nitrogen was derived from nitrate of soda; 50 per cent from ammonia sulphate; and 12½ per cent each from fish scrap and tankage. Potash was derived from muriate of potash (50 per cent K_2O).

[5]The term colloidal phosphate refers to the material designated by the Association of Official Agricultural Chemists as "*soft phosphate with colloidal clay*" and defined as "A very finely divided low-analysis by-product from mining Florida rock phosphate by a hydraulic process in which the colloidal materials settle at points in artificial ponds and basins farthest from the washer and are later removed after the natural evaporation of the water" (A. O. A. C. "Methods of Analysis," 5th ed., 1940, pp. 733).

deficiency of available magnesium. To complete the series of fertilizer treatments a mixture containing only the nitrogen, potassium, and magnesium materials (4–0–7) was included for the purpose of determining the effect of growing potatoes without any added phosphorus.

Experimental Details

The phosphate studies were conducted on Caribou loam soil possessing a *p*H value ranging from 5.0 to 5.4. The cooperation of Mr. Burns Long, Presque Isle, Maine; Mr. Earl Blackstone, Caribou, Maine; and Mr. Merle Duncan, Presque Isle, Maine, was enlisted. These growers furnished land for the experimental studies and in other respects rendered valuable assistance at planting and harvesting, and in the interval between these operations took good care of the crop so far as spraying and other cultural operations were concerned. The tests were conducted on a row basis with 4 to 6 replications of each treatment. The length of row utilized was 225 feet with a 12½-foot cut-off at each end of the row, accomplished by hand digging just prior to the machine digging, thus leaving 200 feet of row for obtaining yield records.

TABLE I
POTATO YIELDS OBTAINED IN PHOSPHATE-SOURCE STUDY

Source of P_2O_5 in 4–8–7 Fertilizer	Yield of potatoes per acre			
	Farm A[1] (1937) Bushels	Farm B[2] (1938) Bushels	Farm C[2] (1938) Bushels	Average of all tests Bushels
Superphosphate..	392	483	390	421.7
Colloidal phosphate.....	303	464	304	357.0
Tenn. brown-rock phosphate.....	318	394	324	345.3
No phosphorus (4–0–7).....	312	429	297	346.0

[1]Irish Cobbler variety grown.
[2]Green Mountain variety grown.

The placement of the different fertilizers was made in accordance with the standard band-placement method[6] in conjunction with planting the seed pieces. In all tests, the rate of fertilizer application was 2,000 pounds per acre. The yields obtained are presented in Table I.

An examination of the results given in Table I shows that in all tests there was a marked response to the superphosphate-containing fertilizer; this was least pronounced on farm B.[7] On farm A the superphosphate-containing fertilizer, in comparison with the no-phosphorus treatment, resulted in an increased yield of 80 bushels to the acre; on farm B, 54 bushels; and on farm C, 93 bushels, an average increase of 75.7 bushels per acre for the three farms.

The colloidal phosphate-containing fertilizer, in comparison with superphosphate mixture, produced 89 bushels less per acre on farm A; 19 bushels less per acre on farm B; and 86 bushels less per acre on farm C, an average decrease for the three farms of about 65 bushels per acre.

The Tennessee brown-rock phosphate, in comparison with the superphosphate mixture produced 74, 89, and 66 bushels less per acre, respectively, for the three farms, an average decrease in yield of about 78 bushels per acre.

The results of the foregoing tests indicate that an available phosphate, such as superphosphate, is more conducive to high yields than either of the less available phosphate materials, colloidal phosphate or Tennessee A Comparison of Colloidal Phosphate—*Cont.* brown-rock phosphate. In fact, the use of the latter materials in some cases resulted in no increase in yield over the no-phosphorus (4–0–7) treatment.

Influence of the Phosphates on Vine and Tuber Development

In order to obtain some information as to the influence of the three phosphates on vine and tuber development, plants[8] were collected from eight uniformly spaced hills in one of the tests[9], and data derived therefrom are given in Table II.

In general, the data given in Table II indicate that the use of the available superphosphate in comparison with the less available phosphate materials and with the no-phosphorus (4–0–8) treatments, resulted in a greater development of vines (stalks and leaves), roots, stolons, and tubers. Similar differences in vine development were obvious in the other tests. Greater differences in yields of tubers were observed during this stage of development (about full-bloom stage) than the final yield data would indicate. The differences suggest that as the root develop-

[6]In a band on each side of the seed piece with about 2 inches of fertilizer-free soil interposed and level with or slightly below the seed piece.

[7]Farm B has been operated as a combination potato-dairy farm. The addition of manure reinforced with superphosphate to the potato crop no doubt resulted in an accumulation of phosphorus above that on the other two farms where fertilizer alone was used.

[8]Green Mountain variety.

[9]Two representative uniformly spaced hills from four replications, when in about full-bloom stage of growth.

ment of the plants became more extensive, more available residual or native phosphorus was in reach of the roots. That is, the apparent deficiency of available phosphorus of plants supplied with either of the less available phosphate compounds or given the no-phosphorus (4–0–8) treatment, was less marked in these plants in their later stages of development.

The final yields indicate the advantage to the plants of having an available source of phosphorus such as superphosphate.

Fig. 1. Comparative effectiveness of colloidal phosphates (C), superphosphate (S), no-phosphorus (N-K), and Tennessee brown-rock phosphate (T) on vine growth and tuber development of potatoes

Representative potato plants with attached tubers, collected from the three phosphate and the no-phosphorus treatments are shown in treatment (S) resulted in the production of larger plants with greater tuber development than did either the colloidal phosphate (C), Tennessee brown-rock phosphate (T), or the no-phosphorus treatment (N-K). For the most part plants grown with the latter two sources of phosphorus did not appear much larger than those which received the no-phosphorus treatment (N-K).

The importance of phosphorus in the life of the potato plant is shown by the excellent studies conducted by Harrington, Iverson, and Pollinger[10] of the Montana Agricultural Experiment Station. These investigators reported that benefits which may be attributed to phosphorus were found to be as follows:

1. Earlier emergence and earlier growth of plant.
2. Increase in the set of tubers per hill.
3. Increase in yields.
4. Improvement in grade.
5. Improvement in type.
6. Better netting on the Netted Gem potato.
7. Better maturity and less skinning.

In their studies the phosphate fertilizers generally used consisted of (1) treble superphosphate, 45 per cent strength, and (2) ammoniated phosphate, 6–30–0 grade. It is of interest to point out that in these Montana investigations only available phosphates were used, which no doubt accounts for the benefits secured.

Summary

In a comparison of superphosphate, colloidal phosphate (Florida), and rock phosphate (Tennessee brown-rock) as sources of phosphorus for potatoes in Aroostook County, Maine, in tests which also included a no-phosphorus treatment, it was found that:
1. The omission of phosphorus, using only a

(Continued on page 26)

TABLE II

INFLUENCE OF THE DIFFERENT PHOSPHATES ON DEVELOPMENT OF POTATO PLANTS[1]

(Green Mountain Variety)

Phosphate source in fertilizer	Number of stalks[2]	Stalks & Leaves		Roots		Stolons		Tubers		
		Green weight Pounds	Dry[3] weight Grams	Green weight Grams	Dry weight Grams	Green weight Grams	Dry weight Grams	No.	Green weight Grams	Relative[4]
No phosphorus (4–0–8)....	18	9.6	530	80	15.2	12	3.25	133	3,867	100
Superphosphate (4–8–7)....	18	13.4	690	100	16.8	30	5.15	125	6,212	161
Colloidal phosphate (4–8–7).	18	9.9	563	84	15.0	20.3	3.71	123	4,641	120
Tennessee brown-rock phosphate (4–8–7).....	18	12.6	688	95	16.6	15.9	3.17	111	4,781	124

[1]Full-bloom stage of growth when sampled.
[2]Two uniformly spaced representative hills from each of four rows.
[3]Air dry weight in case of stalks and leaves; others oven dry.
[4]No-phosphorus control treatment at 100. Relative comparison derived from total tuber weights.

Hawaiian Company Changes Name

The Pacific Guano and Fertilizer Company, 54-year-old pioneer firm in the Hawaiian Islands, has changed its name to Pacific Chemical and Fertilizer Company. Policies and organization remain the same.

The business dates back to 1890 and was founded by George Norton Wilcox (1839–1933), one of Hawaii's great industrial pioneers, who lived to serve his company as president for 42 years.

Pacific Chemical and Fertilizer Company research laboratory and chemical manufacturing are closely linked with Hawaii's sugar and pineapple enterprises and with an island general agriculture growing in self-sufficiency. For Hawaii's advancing manufacturing and processing businesses, Pacific Chemical and Fertilizer Company carries complete lines of industrial chemicals as well as stock-piles of agricultural chemical materials for island use.

J. T. Phillips, vice-president and general manager of the Hawaiian firm, made the announcement of the name-change which was instituted by directors and stockholders at the annual meeting held in Honolulu April 28th.

OPA Appoints Fertilizer and Superphosphate Advisory Committees

Appointment of a Fertilizer Industry Advisory Committee to confer and cooperate with the Office of Price Administration on problems connected with manufacturers' and sellers' maximum prices of mixed fertilizers, nitrogenous fertilizer materials, superphosphate and potash for agricultural use, has been announced by that pricing agency.

The membership of the committee follows:

H. B. Baylor, Vice-President, International Minerals & Chemical Corp., Chicago, Ill.

L. E. Britton, Manager, Fertilizer Department, Consolidated Rendering Company, Boston, Mass.

A. H. Carpenter, Atlanta, Ga.

George Cushman, Treasurer and General Manager, Long Island Produce and Fertilizer Co., New York, N. Y.

Leon Davis, Southern Cotton Oil Co., New Orleans, La.

Ross Hannahan, President, Planters' Fertilizer and Phosphate Co., Charleston, S. C.

N. E. Harman, Secretary-Treasurer and General Manager, Meridian Fertilizer Factory, Hattiesburg, Miss.

Bayless W. Haynes, President, Wilson and Toomer Fertilizer Co., Jacksonville, Fla.

J. A. Howell, Vice-President, Virginia-Carolina Chemical Corp., Richmond, Va.

R. L. King, President and General Manager, Georgia Fertilizer Company, Valdosta, Ga.

D. J. McIntyre, Secretary and Treasurer, Dixie Guano Company, Laurinburg, N. C.

John A. Miller, President, Price Chemical Company, Louisville, Ky.

Weller Noble, Vice-President and Treasurer, Pacific Guano Company, Berkeley, Calif.

C. B. Robertson, President, Robertson Chemical Corp., Norfolk, Va.

W. S. Rupp, Vice-President, Baugh and Sons Company, Baltimore, Md.

C. D. Shallenberger, Vice-President and Manager, Shreveport Fertilizer Works, Shreveport, La.

John W. Sims, Farm Bureau Cooperative Assn., Columbus, Ohio.

Backman Smith, Branch Manager, Naco Fertilizer Company, Charleston, S. C.

R. A. Waite, Sales Manager, Eastern States Farmers Ex., West Springfield, Mass.

Manufacturers of superphosphate will also be represented in all OPA discussions on ceiling price regulations affecting the industry through the appointment by the Office of Price Administration of a Superphosphate Producers' Industry Advisory Committee.

The committee, which will consult with the OPA on all superphosphate price actions during these critical war days, is composed of the following members:

H. B. Baylor, Vice-President, International Minerals and Chemical Corp., Chicago, Ill.

R. P. Benedict, Darling & Company, Chicago, Ill.

L. E. Britton, Manager, Fertilizer Department, Consolidated Rendering Company, Boston, Mass.

L. H. Carter, President, The American Agricultural Chemical Company, New York, N. Y.

A. H. Case, Vice-President, Tennessee Corporation, Tampa, Fla.

F. R. Dulany, President, Southern States Phosphate and Fertilizer Company, Savannah, Ga.

R. A. Jones, Sales Manager, Anaconda Copper Mining Company, Anaconda, Mont.

R. L. King, President and General Manager, Georgia Fertilizer Company, Valdosta, Ga.

S. L. Nevine, General Manager, Arkansas Fertilizer Company, Little Rock, Ark.

W. T. Wright, Vice-President, F. S. Royster Guano Company, Norfolk, Va.

Industry Conferences Recommend Grades for 1944-1945

DURING the past several weeks, a series of sectional meetings has been held to discuss prospects and plans for the fertilizer year covering the fall of 1944 and the spring of 1945. These conferences were attended by U. S. and State Agricultural Department officials, representatives of WFA, WPB, AAA, and OPA, staff members of the National Fertilizer Association, and fertilizer manufacturers. The meetings started in Boston on March 14th, and continued in Philadelphia, Raleigh, Atlanta, Shreveport, Chicago, Tucson, Los Angeles, San Francisco, Seattle, ending in Salt Lake City on April 27th.

Every meeting was well attended and, through the reports of government officials and the discussion of local conditions, gave the conferees as accurate a picture as possible of the outlook for the coming fertilizer year. At each meeting the list of grades to be sold in 1944-45 was thoroughly discussed and the list for each fertilizer-using state was approved, except the final meeting in Salt Lake City, where it was decided not to have an official list for Utah. In almost every state a few changes were made in the previous grades as listed in FPO-5.

The approved list of grades is as follows:

New England Area

Maine. 0–10–20, 0–14–14, 4–12–4, 4–12–8, 4–12–16, 5–7–10, 5–8–7, 5–10–5, 5–10–10, 6–9–15, 7–7–7.

New Hampshire. 0–10–20, 0–14–14, 4–12–4, 4–12–8, 4–12–12, 4–12–16, 5–8–7, 5–10–5, 5–10–10, 6–3–6, 7–7–7.

Vermont. 0–10–20, 0–14–14, 4–12–4, 4–12–8, 4–12–16, 5–8–7, 5–10–5, 5–10–10, 6–3–6, 7–7–7.

Massachusetts. 0–10–20, 0–14–14, 4–12–4, 4–12–8, 4–12–16, 5–3–5, 5–5–15, 5–8–7, 5–10–5, 5–10–10, 6–3–6, 7–7–7. For tobacco plant beds only 4–10–0.

Rhode Island. 0–10–20, 0–14–14, 4–12–4, 4–12–8, 4–12–16, 5–8–7, 5–10–5, 5–10–10, 7–7–7.

Connecticut. 0–10–20, 0–14–14, 4–12–4, 4–12–8, 4–12–16, 5–3–5, 5–5–15, 5–8–7, 5–10–5, 5–10–10, 6–3–6, 7–7–7. For tobacco plant beds only 4–10–0.

Central Atlantic Area

New York. 0–10–20, 0–12–12, 3–9–12, 3–9–15, 3–12–6, 4–8–12, 4–12–4, 4–12–8, 5–10–5, 5–10–10, 7–7–7.

New Jersey. 0–12–12, 0–14–7, 3–9–12, 3–9–15, 3–12–6, 4–8–12, 4–12–4, 4–12–8, 5–10–5, 5–10–10, 7–7–7, 10–6–4.

Pennsylvania. 0–12–12, 0–14–7, 3–9–12, 3–9–15, 3–12–6, 4–8–12, 4–12–4, 4–12–8, 4–12–12, 5–10–5, 5–10–10, 7–7–7, 10–6–4.

Delaware. 0–12–12, 0–14–7, 2–12–12, 3–9–12, 3–9–15, 3–12–6, 4–8–12, 4–12–4, 4–12–8, 5–10–5, 5–10–10, 6–8–6, 7–7–7, 10–0–10, 10–6–4.

Maryland. 0–10–20, 0–12–12, 0–14–7, 2–12–12, 3–9–12, 3–9–15, 3–12–6, 4–8–12, 4–12–4, 4–12–8, 5–10–5, 5–10–10, 6–8–6, 7–7–7, 10–0–10, 10–6–4.

West Virginia. 0–12–12, 0–14–7, 3–12–6, 4–12–4, 4–12–8, 5–10–5, 5–10–10, 7–7–7, 10–6–4.

South Atlantic Area

Virginia. 0–12–12, 0–14–7, 2–12–12, 3–9–12, 3–12–6, 4–12–4, 5–10–5, 6–8–6, 7–7–7, 10–0–10, 10–6–4. For tobacco only 2–10–6, 3–9–6, 4–10–6, 5–5–20. For tobacco plant beds only 4–9–3.

North Carolina. 0–8–16 (basic), 0–12–12 (basic), 0–14–7, 2–12–12, 3–9–9, 3–9–12, 3–12–6, 4–8–8, 4–10–6, 4–12–4, 5–7–5, 5–10–5, 6–8–6, 10–0–10. For tobacco only 2–10–6, 3–9–6, 5–5–20. For tobacco plant beds only 4–9–3.

South Carolina. 0–14–7, 0–12–12, 3–9–9, 3–9–12, 3–12–6, 4–8–8, 4–10–6, 4–12–4, 4–12–12, 5–10–5, 5–10–10, 6–8–6, 7–7–7, 6–9–3. For tobacco only 3–9–6. For tobacco plant beds only 4–9–3.

Georgia. 0–14–7, 0–14–10, 2–12–6, 3–9–6, 3–9–9, 3–12–6, 4–8–6, 4–8–8, 4–10–6, 4–12–4, 5–10–5, 6–8–6, 6–8–8, 10–0–10. For shade tobacco only 4–4–8. For tobacco plant beds only 4–9–3.

Florida. 0–8–12, 0–8–24, 0–10–10, 0–12–16, 0–14–5, 0–14–10, 0–16–0, 2–8–6, 2–8–10, 2–10–4, 3–6–10, 3–8–5, 3–8–8, 4–4–8, 4–5–7, 4–6–8, 4–7–5, 4–8–4, 4–8–6, 4–8–8, 4–9–3, 4–10–7, 4–12–4, 4–12–6, 5–5–8, 5–6–10, 5–7–5, 5–8–8, 6–4–8, 6–6–6, 8–0–8, 8–0–12, 12–0–10. For victory gardens only 5–10–5.

South Central Area

Alabama. 0–14–10, 4–10–4, 4–10–7, 6–8–4, 6–8–8. For tobacco only 3–9–9.

Tennessee. 0–14–4, 0–14–7, 0–12–12, 2–12–6, 3–9–6, 4–8–8, 4–12–4, 4–8–12, 5–10–5, 5–5–10, 6–8–4, 7–7–7, 8–5–5, 10–6–4.

Mississippi. 0–14–7, 4–8–8, 5–10–5, 6–8–4, 6–8–8. Possible addition 10–6–4 or 10–6–8.

Louisiana. 0–12–12, 0–14–7, 3–12–12, 4–8–8, 4–12–4, 4–12–8, 5–10–5, 6–8–4, 6–9–6, 8–8–8, 9–6–9, 10–0–10, 12–8–0, 10–6–4.

Texas. 0–14–7, 4–8–8, 4–10–0, 4–12–4, 5–10–5, 6–8–4, 6–12–0, 6–30–0, 10–10–0, 10–20–0, 12–15–0. Possible addition 8–8–8.

Arkansas. 0–10–20, 0–12–12, 0–14–7, 3–9–18, 3–12–6, 4–8–8, 4–12–4, 5–10–5, 6–8–4, 6–8–12, 8–8–8, 10–6–4.

Oklahoma. 0–14–7, 2–12–6, 4–12–4, 4–12–6, 5–10–5. Possible addition 3–12–6 (in place of 2–12–6 and 4–12–6).

Middle Western Area

Ohio. 0–9–27, 0–10–20, 0–12–12, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 3–9–18, 3–12–12, 3–18–9, 4–12–8, 5–10–10, 8–8–8, 10–6–4.

Indiana. 0–9–27, 0–10–20, 0–12–12, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 3–9–10, 3–12–12, 3–18–9, 4–12–8, 5–10–10, 8–8–8, 10–6–4. Also 0–6–18 (to contain 700 lb. of sodium chloride).

Kentucky. 0–12–12, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 3–9–6, 3–12–12, 3–18–9, 4–12–4, 4–12–8, 5–10–10, 8–8–8, 10–0–10, 10–6–4. For tobacco plant beds only 4–12–0.

Michigan. 0–9–27, 0–10–20, 0–12–12, 0–14–14, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 2–16–8, 3–9–18, 3–12–12, 3–18–9, 4–12–8, 4–16–4, 8–8–8, 10–6–4. Also 0–6–18 (to contain 700 lb. of sodium chloride).

Illinois. 0–9–27, 0–10–20, 0–12–12, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 3–9–18, 3–12–12, 3–18–9, 4–12–8, 4–12–4, 8–8–8, 10–6–4.

Wisconsin. 0–9–27, 0–10–20, 0–12–12, 0–14–14, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 3–9–18, 3–12–12, 3–18–9, 4–12–8, 6–6–18, 8–8–8, 10–6–4. Also 0–6–18 (to contain 700 lb. of sodium chloride).

Minnesota. 0–9–27, 0–10–20, 0–12–12, 0–12–24, 0–12–36, 0–20–20, 0–14–7, 0–20–10, 0–30–15, 2–12–6, 2–16–8, 3–9–18, 3–12–12, 3–18–9, 4–12–8, 4–16–16, 4–24–12, 6–12–18, 8–8–8, 8–16–12, 10–6–4.

Iowa. 0–9–27, 0–10–20, 0–12–12, 0–14–14, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 2–16–8, 3–9–18, 3–12–12, 3–18–9, 4–12–8, 4–16–4, 8–8–8, 10–6–4.

Missouri. 0–10–20, 0–12–12, 0–20–20, 0–14–7, 0–20–10, 2–12–6, 3–9–18, 3–12–12, 3–18–9, 4–12–4, 4–12–8, 5–10–10, 8–8–8, 10–6–4.

Pacific Coast Area

Arizona. 4–8–0 (manure base only), 4–12–4, 4–19–5, 6–10–4, 6–12–0, 6–18–0, 8–8–0, 8–12–0, 8–16–0, 10–10–0, 10–20–0, 10–38–0, 14–6–0.

California. 0–10–8, 0–10–12, 2–10–8, 4–6–8, 4–10–10, 4–12–4, 4–18–18, 5–12–5, 5–14–9, 6–9–6, 6–10–4, 6–12–8, 6–16–6, 8–0–12, 8–6–8, 8–8–4, 8–10–12, 10–5–5, 10–5–10, 10–10–0, 10–10–5, 10–12–10, 10–16–8, 10–20–0, 12–0–14, 12–6–0, 14–0–8, 15–8–4, 17–7–0.

Oregon. 0–12–20, 3–10–10, 3–10–20, 4–12–4, 4–12–8, 5–6–8, 5–10–10, 5–10–20, 6–10–4, 6–30–0, 10–10–0, 10–10–5, 10–16–8, 10–20–0, 12–12–0, 17–12–0, 17–4–4.

Washington. 0–12–20, 3–10–10, 3–10–20, 4–12–4, 4–12–8, 5–6–8, 5–10–10, 5–10–20, 6–10–4, 6–30–0, 10–10–0, 10–10–5, 10–16–8, 10–20–0, 12–12–0, 17–12–0, 17–4–4.

Idaho. 0–12–20, 3–10–10, 3–10–20, 4–12–4, 4–12–8, 5–6–8, 5–10–10, 5–10–20, 6–10–4, 6–30–0, 10–10–0, 10–10–5, 10–16–8, 10–20–0, 12–12–0, 17–12–0, 17–4–4.

Deep Placement of Fertilizer and Limestone

Deeper placement of a considerable part of the total fertilizer application and limestone where needed has resulted in greatly increased efficiency in their use in numerous official experiments. Although this desired deeper placement may be effected by broadcasting part of the lime or fertilizer before plowing, efficient equipment which can be bolted onto any riding plow or tractor plow will put the material on the bottom of the plow furrow with equal or greater efficiency. In soils which have developed "plow pan or plow sole" and which are reasonably free from rocks and large roots, the efficiency of this deep placement is markedly increased by attaching a small subsoil chisel to the plow which breaks up the plow sole and mixes the fertilizer with the subsoil. Such an attachment has been developed at the New Jersey Experiment Station, and substantial increases in yield and quality of crops have resulted from its use. Farmers interested in greater efficiency in fertilizer use from deeper placement are urged to consult their experiment station on the merits of the method and what proportions of the total fertilizer application to plow down and place in the row.

IT MAY BE

By SAMUEL L. VEITCH

RATIONING

It may be that by July steaks and roasts will find a sharp drop in point value. And it may be that meat rationing will start again in January.

If you read anything about rationing to end, add a little salt and don't believe it. Ration points will be adjusted and fluctuate with supply and demand.

AGRICULTURE

Are the farmers who are holding corn at $2 slightly peeved at the administration for enforcing the $1.16 ceiling? You bet they are.

It may be that crop control of some fashion will be continued long after the war. WFA is starting to give some thought to converting agriculture from a wartime basis to a peacetime basis. Postwar feeding of Europeans will help American agriculture dispose of some of its heavy wartime production, until business adjusts itself to a high level of postwar activity.

If you are giving some thought to farm prices after the war, don't forget the Steagall amendment, and several other price-stabilization amendments. Also, remember Congress has acted to continue support-prices for two years after the war, at 90 per cent of parity. Of course, Congress could make some changes in the formula, but it is a fairly safe, bet regardless of November results, that farm income will be supported and maintained just as far as possible.

The New York cotton exchange investigation by the Senate will not amount to a hill of beans so far as new legislation and new regulations are concerned, although the House investigation may take a look (after conventions) at shipper organization, crossroads auctions, exchanges and a few other blood relatives. It may be done in a series of six steps, i. e., transportation, profit margins, pricing mechanisms, shipping point facilities, terminal market facilities and postwar agriculture markets.

BUSINESS

It may be well to draw a big circle on your calendar the moment "D-Day" arrives, and get ready for commercial production. Give your sales department a shot in the arm of "get-up-and-go" and look for civilian orders. The swing over may take place much more quickly than anticipated, particularly if you are among those thinking it will be a 6-to-12-month interval between the slackening off of war orders, and the picking up of civilian production.

The outcome of the Montgomery Ward fiasco may be the "swan song" of the War Labor Board. They stand to lose prestige or may fall apart completely. You can depend on Congress giving this case a whirl. They have been receiving nasty remarks in their fan mail.

GASOLINE

You may get a little more gasoline by July 1st. Some thought is being given in that direction. It may be increased 33½ per cent all along the line on A, B and C cards. Victory gardeners cultivating 1500 square feet and over, can now get a little extra gasoline, provided they have to travel the required miles (maximum of 300 miles for the season). In case you are turning it over in your mind, digging turf on a golf course cannot be classed as Victory gardening.

DRAFT

Employers should ask induction stays for men over twenty-five, who are called up by local Draft Boards, provided those men are in essential or locally needed activities, regardless of the jobs they hold in those activities. Selective Service has not rescinded its April 7th order staying such inductions.

It is officially estimated that 350,000 youths, physically fit and under age twenty-six, could be taken from farms if local Draft Boards applied the standards that govern industrial deferments. Could this be another headache for the farmer?

PASTURE NOTES

Compiled by R. H. Lush, Pasture Specialist, The National Fertilizer Association

Alabama

Supply Nutrients.—Pasture plants, like other crops, are deficient in certain elements that are deficient in the soil. Use 1,000 pounds of superphosphate, or equivalent, in preparing the land, or apply 300 pounds of superphosphate and a minimum of 50 pounds of muriate of potash annually, especially in the Coastal Plains areas, suggests J. C. Lowery, extension agronomist, *Southern Agriculturist, March, 1944.*

Connecticut

Use Nitrogen Early.—Nitrogen at from 28 to 84 pounds per acre, applied in addition to minerals, gave the following increases over unfertilized plots: spring application, 188 per cent; spring and summer applications, 223 per cent; and summer application, 160 per cent. But when these comparisons are made with the superphosphate-limestone plots, additional pasturage would be: from spring nitrogen, 30 per cent; spring and summer nitrogen, 46 per cent; and summer nitrogen, 18 per cent. Most of the increased growth from spring nitrogen occurred before June 16th. But the seeding and proper management of legumes appear to be a much better method of maintaining an adequate supply of summer pasturage than the intensive use of nitrogenous fertilizer on grasses.—*Conn. (Storrs) Agri. Exp. Sta. Bul. No. 245, 1943.*

Florida

Productive Pastures.—Dairymen have applied 10 carloads of lime and 45 tons of 0–14–10 fertilizer to clover and other pastures during the past month, according to County Agent A. S. Lawton, Duval County. "Dairymen have found that fertilizer is necessary for success with pastures," he reports.

Georgia

More Feed Crops.—Total acreage of winter cover crops sown in Georgia in the fall of 1943 was only 379,000 acres, as compared to 482,000 acres in the previous year, reports Walter S. Brown, director of the Georgia Extension Service. However, there was an increase of 4 per cent in oats, 11 per cent in wheat, and 5 per cent for barley. Permanent pasture seeded during the year totalled 95,000 acres, as compared to only 45,000 in 1942. There were also large increases in supplementary grazing and hay crops with about 112,000 tons of 16 per cent superphosphate equivalent used on these special hay, pasture, and soil improvement crops.

Illinois

Soil Treatment Adds Protein.—Liming added from 40 to 75 pounds more protein to the ton of lespedeza hay, and phosphate an additional 10 to 20 pounds, reports H. J. Snider, assistant chief of soil experiment fields, referring to work in southern Illinois for 1943. Soil treatment may increase lespedeza hay or pasture yields to two or three times that of untreated land and increase the amount of essential minerals.

Indiana

Speed Up Pasture Production.—Use lime if necessary, and, after thorough disking, 400 to 500 pounds per acre of 0–14–7 or 0–12–12 fertilizer applied with a fertilizer-grain drill. A seeding of clovers or, in the part of the State south of Indianapolis, of part Korean lespedeza should be made, advise Purdue extension agronomists. Old stands of alfalfa and clover should be top-dressed this spring with about 200 pounds of 0–12–12 or 0–14–7 and Sudan grass planted, in order to give more grazing during July and August.

Iowa

Improve All the Pastures.—"Pastures on most Iowa farms have been neglected. Consequently they are producing far below their full capacity." This statement, made by Prof. H. D. Hughes, Iowa State College, could also be made of every State in the Union. Invariably pastures need an application of phosphorus and nitrogen. In fact, a balanced fertilizer containing nitrogen, potash, and phosphorus can be used to advantage on many of the so-called pastures where the fertility is no longer adequate to produce large quantities of good grass. Grass is one of our best feeds, and we must be directed to feed the soil that produces it if the best returns are to be expected.—*Hoard's Dairyman, March 10, 1944.*

Fertilizer Valuable Aid to Feed Production.—The use of ammonium nitrate (or other sources of nitrogen) will increase returns per acre from hay and pasture and help make up for the decrease in acreage of those crops, suggests H. R. Meldrum, extension agronomist. He recommends 100 pounds per acre to get earlier grazing on permanent grass sod and 50 to 70 pounds per acre for new seedings of grass or hay, all applied early.—*Better Iowa, March 20, 1944.*

Massachusetts

Grow More Feed by Heavier Top Dressing.—No way to increase yields takes so little labor and presents such a good opportunity for cutting feed costs as top dressing. About 8 to 10 tons of manure, plus 150 pounds of ammonium nitrate, or its equivalent, or 400–600 pounds of 7–7–7, are suggested for grass sods early this spring. Another 100 pounds of ammonium nitrate or more of complete fertilizer is suggested immediately after early haying. For legumes, use 400–600 pounds of 0–14–14 and manure, suggests Ralph W. Donaldson, extension agronomist.

Mississippi

Fertilize to Grow More Feed.—Many Mississippi farmers can increase legume hay production by 75 to 100 per cent by using lime and phosphate, or 300 to 400 pounds of 0–14–7 fertilizer to the acre except in the Delta. About 32 pounds of nitrogen used on oats or as a side dressing for corn will also increase production 70 to 100 per cent. The use of fertilizers to increase production is far too important this year to be left out of the picture on any farm.

Missouri

Sound Agriculture.—Increased use of fertilizer on five million acres of cropland and three million acres of pasture is one of the recommendations of a Missouri Post-War Planning Committee.

New Hampshire

Feed From Fertilizer.—If each of the 209,000 New England acres of alfalfa, Ladino, red and alsike clovers were fertilized properly with 300 pounds of an 0–20–20 fertilizer above that now received there would be an increase of 482,000 tons of hay, equivalent to 118,000 tons of 18 per cent grain feed, a net saving to New England farmers of about $5,000,000, as well as the transportation of more than 80,000 tons of freight. Then if one-half acre of pasture were fertilized for each cow in New England there would be a further increased production of 53,000 tons of protein, equivalent to 296,000 tons of 18 per cent dairy feed, said Prof. Ford S. Prince in *Better Crops with Plant Food, Feb., 1944.*

New Jersey

More Feed in 1944.—Where essential minerals have previously been applied, the use of 50 to 60 pounds of nitrogen per acre will give 10 to 15 days earlier grazing in the spring or increase early cut hay by ¾ ton per acre. Where minerals are lacking, use 1,000 pounds of a 5–10–5 or 5–10–10 fertilizer as a spring application. Alfalfa and the clovers can be stimulated to greatly increased production by top-dressing with 500 pounds of an 0–12–12 fertilizer, and on some soils the use of 20 pounds of borax may produce an extra ton of alfalfa hay. For spring seeding, a top dressing of 500 pounds of 5–10–10 or the use of 5 tons of phosphated manure is effective. The same treatment is good for sodland plowed for corn with as much as 800 pounds of fertilizer being used on unmanured soil and the use of 500 pounds of 5–10–5 for spring grain or for summer grazing crops such as Sudan grass or millet is suggested by Dr. Firman E. Bear.

New York

New Grassland Agriculture.—Top-dressing about one-half acre per cow of native pasture with 60 pounds each of nitrogen, phosphoric acid, and potash, plus lime if needed, will give immediate and profitable returns, but improvement by plowing and reseeding with adapted legumes frequently produces 2,000 to 5,000 pounds more milk per acre over a 3 or 4 year period, states Dr. D. S. Fink, Cornell agronomist, *Hoard's Dairyman, March 25, 1944.*

North Carolina

Fertilized Pastures More Nutritious.—After a period of three years and following a severe drought, lime and superphosphate increased the dry matter in pasture and meadowland by about four-fifths and more than doubled the amount of protein. Likewise, the calcium yield was almost doubled and the phosphorus yield considerably more than doubled, reports Dr. J. O. Halverson and Dr. F. W. Sherwood, North Carolina Experiment Station.

Ohio

Use More Nitrogen for More Feed.—About 20 to 40 pounds of nitrogen per acre are recommended for spring top dressing of grain crops without new seedings; 40 to 60 pounds on permanent grass pastures or rotation hay-type pastures, to obtain early grazing; 50 to 65

(Continued on page 26)

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Principal Articles in This Issue

A COMPARISON OF COLLOIDAL SUPERPHOSPHATE, ROCK PHOSPHATE, AND SUPERPHOSPHATE AS SOURCES OF PHOSPHORUS FOR POTATO FERTILIZER IN AROOSTOOK COUNTY, MAINE . . 5
OPA Appoints Fertilizer and Superphosphate Advisory Committees 8
INDUSTRY CONFERENCES RECOMMEND GRADES FOR 1944–1945 9
IT MAY BE 11
PASTURE NOTES 12
Fertilizer Prices Continue at Relatively Low Level 14
N. F. A. Annual Meeting 15
Incentive Pay Recommended for Superphosphate Industry 15
April Tag Sales 16
FERTILIZER MATERIALS MARKET:
New York 17
Baltimore 17
Charleston 19
Chicago 19
Tennessee Phosphate 20
North American Deliveries of Potash Salts 22
Chile Builds a New Mechanized Nitrate Plant 22

Fertilizer Prices Continue at Relatively Low Level

It was predicted in June, 1943, that ". . . any further rise in prices (received by farmers) is likely to prove moderate in extent . . ." The rise in prices in the last year has been even less than the "moderate" one of the forecast. The rise, in fact, has been negative, as the Department of Agriculture index of prices received by farmers was a little less on April 15th than it was a year earlier.

Prices paid by farmers have continued to rise moderately in the last year, however, as shown in the last column of the table below. All commodities purchased rose 6 per cent on the average. Fertilizer prices were the same in the two periods. Increases in the other commodity groups ranged from 2 to 17 per cent. Farm wage rates increased 22 per cent.

CHANGES IN PRICES RECEIVED AND PAID BY FARMERS
(Based on Indexes Compiled by U. S. Department of Agriculture)

	Per cent Increase to April 15, 1944 from—		
	1910–1914 avge.	1935–1939 avge.	April 1943
Prices received by farmers.	96	83	—0.5
Prices paid by farmers:			
All commodities	75	40	6
Fertilizer	21	21	0
Feed	81	68	15
Farm machinery	71	13	2
Building materials	101	36	10
Equipment and supplies	39	25	8
Seed	174	76	17
Food	66	46	4
Clothing	99	58	8
Furniture and furnishings	97	44	9
Farm wage rates	198	159	22
Cash farm income	266	173	5

It is brought out by the figures in the second column that prices received by farmers have advanced about twice as much since the period immediately preceding the war as have prices paid. The smallest rise in the period covered has been in farm machinery. The next smallest increase has been in fertilizer prices.

The first column shows the price changes since 1910–1914, the period used in computing price parity. The most striking thing about these figures is the relatively small increase in fertilizer prices. (The 21 per cent increase in fertilizer prices shown in each of the first two columns is due to the fact that the Department of Agriculture fertilizer price index averaged 100 in 1935–1939, the same as in the base period, 1910–1914.)

N. F. A. Annual Meeting

The annual meeting of the National Fertilizer Association will be held at the Biltmore Hotel, Atlanta, Ga., on Tuesday, June 20th and Wednesday, June 21st. Sessions will begin at 10:30 A. M. The meetings, like last year, will be confined to business only. Discussions will relate to the industry's participation in the war effort and its place in the post-war period and developments. There will be no recreational program.

Because of the war burden on transportation facilities, the usual invitation to non-participants in the association's work is not being issued, and members, active and associate, and non-member contributors are asked to bear this in mind in arranging for representation at the meeting.

The Board of Directors, as well as some of the Association Committees, will meet on Monday, June 19th.

Incentive Pay Recommended for Superphosphate Industry

Seeking a solution to manpower shortages that are now limiting production, members of the War Production Board's Superphosphate Industry Advisory Committee have recommended study of incentive pay plans for the industry, WPB reported on April 22nd.

Such plans, it was hoped, would reduce labor turnover and increase the production efficiency of industrial plants, committee members said. Letters regarding wage incentives are now being addressed to the industry by the War Production Board. Members of the committee reported at a recent meeting that in some areas the labor problem was qualitative as well as quantitative. Major manpower problems have been encountered in connection with the storage and shipment of superphosphate, they said, because of inability to obtain sufficient common labor.

Officials of the War Food Administration reported that a survey had indicated that approximately 4,000 additional workers are urgently needed for superphosphate production.

Chemicals Bureau officials informed the committee that, with the exception of the Philadelphia area, the supply of commercial sulphuric acid in the East Coast Region is adequate to meet the requirements of superphosphate producers, but that shortages have been reported in Texas and Louisiana. The construction of new facilities now under way in California is expected to increase the availability of acid for the West Coast superphosphate plants.

The 1943–44 program calls for the production of 7,000,000 tons of normal superphosphate, with an annual production rate of 8,000,000 tons at the end of the current season.

WFA Authorizes More Nitrogen for Crops

The War Food Administration has authorized the use of increased amounts of chemical nitrogen materials for straight application on crops in allstates east of the Rocky Mountains.

Compared with last year, substantially larger quantities of some chemical nitrogen materials are available this year. The increased use of nitrogen permitted by the new directive (War Food Order No. 5.6) should help farmers meet the food crop goals this year.

Under the new directive, a farmer may apply as much straight chemical nitrogen material per acre as the State Agricultural Experiment Station recommends for his area and for the crop on which he plans to use the material. Under the general fertilizer order, WFO-5 (formerly designated as FFO-5), a farmer growing crops listed as "Group B" crops—including corn, cotton and others for which side-dressing is desirable—was limited to the customary rate of application for his farm or area. The rate recommended for those crops by the State Agricultural Experiment Station was permitted only where it was already customary to apply as much straight chemical nitrogen material as the station recommended.

Borax Treatment for Sweet Potato Seed

Virginia Truck Experiment Station Bulletin No. 109 discusses chemicals effective for sweet potato seed treatments. Laboratory tests on fungicidal effectiveness of the various chemicals indicate that satisfactory control of the black root rot can be obtained by treating the seed sweet potatoes with 0.1 per cent bi-chloride of mercury, 0.1 per cent bi-chloride of mercury plus sulphur, yellow oxide of mercury, Semesan Bell, borax, boric acid, or lime

sulphur. From the experiments it has been concluded that boric acid, borax, or lime-sulphur may be substituted for bi-chloride of mercury. Borax probably would be more desirable than boric acid as it is cheaper and generally obtainable from grocery stores in convenient pound packages.

April Tag Sales

Fertilizer tax tag sales in February, March, and April were less than in the corresponding months of last year. In former years those were the three peak months, and a decline in sales in those months almost invariably meant a decline in total fertilizer consumption for the year.

The decline this year, however, is just one more indication that the buy-your-fertilizer-early program was a success. In the fiscal year to date, from July through April, total tag sales amounted to 6,939,000 tons, compared with 6,171,000 tons in the corresponding part of last year and 5,449,000 tons two years ago.

April sales this year of 778,000 tons compare with sales of 1,461,000 tons in April, 1941. Sales in January of this year were 1,244,000 tons, compared with only 546,000 tons in January, 1941. Sales of last December of 718,000 tons compare with 184,000 tons in December, 1940.

In examining the figures in the table below it should be kept in mind that tag sales in last November and December, representing almost entirely 1944 business, were 574,000 tons larger than in the corresponding two months of the previous year.

FERTILIZER TAX TAG SALES

State	April				January-April		
	1944 Tons	1943 Tons	1942 Tons	% '43	1944 Tons	1943 Tons	1942 Tons
Virginia	62,471	58,489	53,621	102	279,333	273,724	279,991
North Carolina	180,532	201,706	134,595	96	939,072	978,995	948,402
South Carolina	89,003	98,148	75,605	89	576,031	645,895	548,344
Georgia	102,224	106,538	114,027	96	772,123	804,714	675,772
Florida	54,704	64,210	55,766	108	333,476	308,370	266,943
Alabama	62,000	87,800	96,550	93	531,250	568,800	513,200
Mississippi	32,710	50,800	55,025	93	272,304	291,736	249,465
Tennessee	51,133	54,273	41,960	106	163,443	154,039	121,310
Arkansas	15,050	24,935	15,400	64	86,983	135,485	115,400
Louisiana	13,685	29,150	19,850	91	124,085	137,063	120,286
Texas	30,940	24,050	15,700	108	121,905	113,230	99,733
Oklahoma	180	2,400	1,091	72	10,551	14,571	6,896
Total South	694,632	802,499	679,190	95	4,210,556	4,426,622	3,945,742
Indiana	26,507	40,325	37,855	76	149,737	197,125	220,441
Illinois	10,580	7,012	15,336	138	74,130	53,734	55,629
Kentucky	38,025	27,625	29,525	154	141,574	92,003	95,246
Missouri	5,676	5,272	4,257	156	65,865	42,346	32,653
Kansas	2,620	1,291	340	440	14,476	3,290	1,259
Total Midwest	83,408	81,525	87,313	115	445,782	388,498	405,228
Grand Total	778,040	884,024	766,503	97	4,656,338	4,815,120	4,350,970

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No Stocks of Sulphate of Ammonia or Potash Accumulating. Labor Shortage Hampers Many Material Producers. More Triple Superphosphate Shipped to Pacific Coast. Imports of Moroccan Phosphate Rock Expected.

Exclusive Correspondence to "The American Fertilizer"

NEW YORK, May 2, 1944.

Sulphate of Ammonia

Production has been maintained, but no stocks are accumulating as buyers are taking their allocations without delay. The use of ammonium nitrate has prevented any lack of inorganic ammonia and the War Food Administration has authorized the increased usage of inorganic ammonia for straight application on certain crops in certain states.

Nitrate of Soda

Material is being delivered in line with allocation, and there appears to be sufficient material to take care of quantities allocated.

Potash

Production has held with indications that there will be an increase in total tonnage produced for the new fertilizer year in spite of labor difficulties in all plants. Demand continues and most buyers are trying to get their third period allocations into their plants as early as possible.

Superphosphate

There is nothing new in this commodity. Many plants continue to produce everything possible with the labor situation presenting the greatest difficulty. Larger quantities of triple superphosphate were released to the fertilizer manufacturers for the balance of the year, but total supply was taken up without delay by the fertilizer manufacturers. Due to the extreme need for phosphates in the California area, a considerable portion of the expected May-June production was allocated for shipment to that part of the country.

Phosphate Rock

Demand continues active, with deliveries being maintained. It is understood that quite a few boats are expected shortly with Moroccan rock, but with the demand there is no doubt that this material will be absorbed quickly.

Cottonseed Meal

Possibly due to the late season and also due to the fact that manufacturers are willing to store material for future use, demand from the New England area continues for further quantities of the imported material.

BALTIMORE

Critical Shortage of Manpower Threatens Tonnage of Fertilizer Shipments. Situation Critical. Adequate Supply of Most Materials Available.

Exclusive Correspondence to "The American Fertilizer"

BALTIMORE, May 2, 1944.

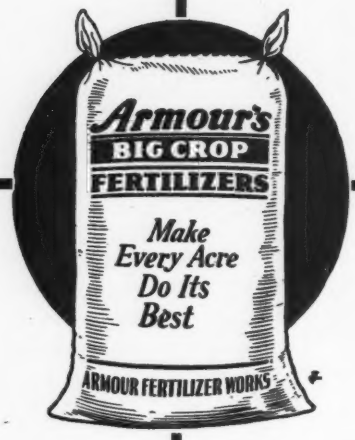
With the advent of warmer weather, there is considerable concern on the part of fertilizer manufacturers in this section about the tonnage of complete fertilizer they will be able to ship. Available manpower supply is 40 to 50 per cent less than normal at this time of the year, and if the warm weather continues another two weeks it will have a tendency to shorten the fertilizer season and materially lessen the tonnage of complete fertilizer to such an extent that there may be actual crop shortages this year.

Ammoniates.—The situation remains unchanged in that practically all organic ammoniates are now being used in feeding materials.

Castor Meal.—Producers continue sold up and are not disposed to take on any future business.

Fish Scrap.—There have been some sales at ceiling price of new crop, for shipment "if and when made," which price, however, will preclude the use of fish meal as a fertilizer material.

Sulphate of Ammonia.—Shipments are still being made against allocations. As fertilizer



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MENTION "THE AMERICAN FERTILIZER" WHEN WRITING TO ADVERTISERS.

manufacturers prefer this form of ammonia to ammonia liquors, they are conserving their supplies, and there are no resale offerings on the market.

Nitrate of Soda.—In view of weather conditions it would appear that the use of more nitrate of soda for top dressing will be resorted to this season than in the past. The market remains unchanged, and deliveries are still being allocated.

Superphosphate.—Stocks at this time of the year are at a minimum, and for some months past it has been impossible to make any new purchases even at ceiling price of 64 cents per unit of A. P. A. for run-of-pile, in bulk, f. o. b. producers' works.

Potash.—There seem to be ample supplies to cover manufacturers' legitimate requirements, and there is no shortage except possibly of sulphate of potash which is only obtainable in a limited way.

Bone Meal.—The situation on both raw and steamed bone meal remains unchanged with the demand and offerings practically nil.

Bags.—It is anticipated that for the fall season there will be a large proportion of burlap bags used for shipment of fertilizer, due to the scarcity of cotton and paper, and also to the fact that in some sections farmers prefer burlap bags because they can use them over and over again for various farm products. The market in the meantime remains unchanged at ceiling levels which were established quite some time ago.

CHARLESTON

Wet Weather Curtails Fertilizer Orders. Some Truck Farmers Hard Hit. Foreign Organics Going Principally to Great Britain.

Exclusive Correspondence to "The American Fertilizer"

CHARLESTON, May 2, 1944.

Due to the extremely wet season, orders for mixed fertilizers have broken off sharply and in the truck belt cabbage and potato farmers have lost heavily. The War Food Administration has authorized the use of additional chemical nitrogen for direct application.

Organics.—No prices have come out as yet on organics for the coming season, nor has any announcement been made as to the allocations.

Blood.—No change in the market is recorded. Domestic material is priced at $5.53 per unit of ammonia ($6.72 per unit N) f. o. b. Chicago. There is an exceedingly limited supply. Foreign blood is scarce and has been largely going to feed. Imports on this as well as tankage to America have been considerably lower recently, as the British have been willing to pay higher prices.

Hocf Meal.—The market for this product is $4.25 to $4.50 per unit of ammonia ($5.16½ to $5.47 per unit N), f. o. b. Chicago. Supplies are very scarce.

CHICAGO

Fertilizer Organics in Very Short Supply with Few Sales Reported. Feed Demand Continues Later than Usual.

Exclusive Correspondence to "The American Fertilizer"

CHICAGO, May 1, 1944.

Buyers are finding but little success in their efforts to locate supplies of organics. Only a few scattered sales are reported. Producers find no change in their position, as raw material and labor shortages are still acute.

Demand for feed continues, notwithstanding pasture lands will tend toward easing the situation. Mixers are displaying, more noticeably than heretofore, discrimination as to quality of dry and wet rendered tankage in their purchases.

Ceilings are well maintained:

High grade ground fertilizer tankage, $3.85 to $4.00 ($4.68 to $4.86 per unit N) and 10 cents; standard grades crushed feeding tankage, $5.53 per unit ammonia ($6.72 per unit

Manufacturers' Sales Agents for **DOMESTIC**

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N); blood, $5.38 ($6.54 per unit N); dry rendered tankage, $1.21 per unit of protein, Chicago basis.

TENNESSEE PHOSPHATE

Shipments Almost One-third Less than Capacity, Due to Labor Shortage. Farmer Transportation of Ground Rock Obstructed by I. C. C. Ruling.

Exclusive Correspondence to "The American Fertilizer"

COLUMBIA, TENN., May 1, 1944.

Because of the late spring, the farmers generally are behind in their work and some outside phosphate operations are so much behind that necessary stock piles are reduced to the lowest minimum.

Available manpower to operate the present facilities is so greatly lacking that not over 70 per cent capacity loading is in evidence anywhere in the field. At that, the increased capacity is making possible about 25 to 30 per cent increase in shipments over the same months of 1943, the banner year of production in history. Even so, the orders have piled up so rapidly that it is estimated the industry catering to farmers for direct application could run for three years without a new order.

At the recent meeting of key representatives of the principal shipper of ground rock, about twenty-five were present from Illinois, Indiana, Kentucky, Iowa, Missouri, and Oklahoma, made up of those who had distributed 1,000 tons or over during the past season. All of them were in session not in regard to additional sales, but to consider how to best distribute the enormous volume of unfilled orders to effect the greatest food production for winning the war.

Considerable attention is being given to the question of truckers taking ground phosphate rock back to farmers in states north of the Ohio River, and one producer has entirely discontinued loading trucks to avoid danger of prosecution by I. C. C. It seems that a trucker in Illinois can buy a load of corn or other farm product and transport it to Tennessee or any other Southern state, where he sells it to the first available customer. In order to get a return load, he can buy fence posts, lumber, cattle or any one of a number of Southern products, to take back to Illinois or elsewhere and his trip is o. k., with no violation of I. C. C. law. If, however, he purchases a load of ground phosphate rock for a farmer in Illinois and thus makes his home load to save gasoline and tires, I. C. C. says he is violating the law. As few producers here are actually equipped to load trucks economically, there will be no disposition on their part to fight the law, but it is believed that the farmers and truckers interested could easily get relief by proper appeal.

The State Committee, which will report to the next legislature recommendations as to requiring phosphate miners to resurface or otherwise restore the mined-over areas, made a day's investigation of the situation in Maury County. After an open luncheon meeting at the Maury Hotel in Mt. Pleasant, where twenty-two local parties interested met the committee, the latter went with them over the mined area. Figures show that less than 1 per cent of the area of Maury County has actually been disturbed. Earnest and careful attention is being given the matter and it is expected that the legislation recommended will be entirely satisfactory to the actual producing interests. The only real hardship, if any, will fall on the independent property owner who is not operating but holding his property for the future, in the hope of getting a good price for it. He may have to sell more cheaply to avoid incurring heavy cost of refilling idle land.

Announcement has just been made by the War Department of the early erection of a war plant adjoining Monsanto, to cost the government about two million dollars and to be operated by Monsanto for the government.

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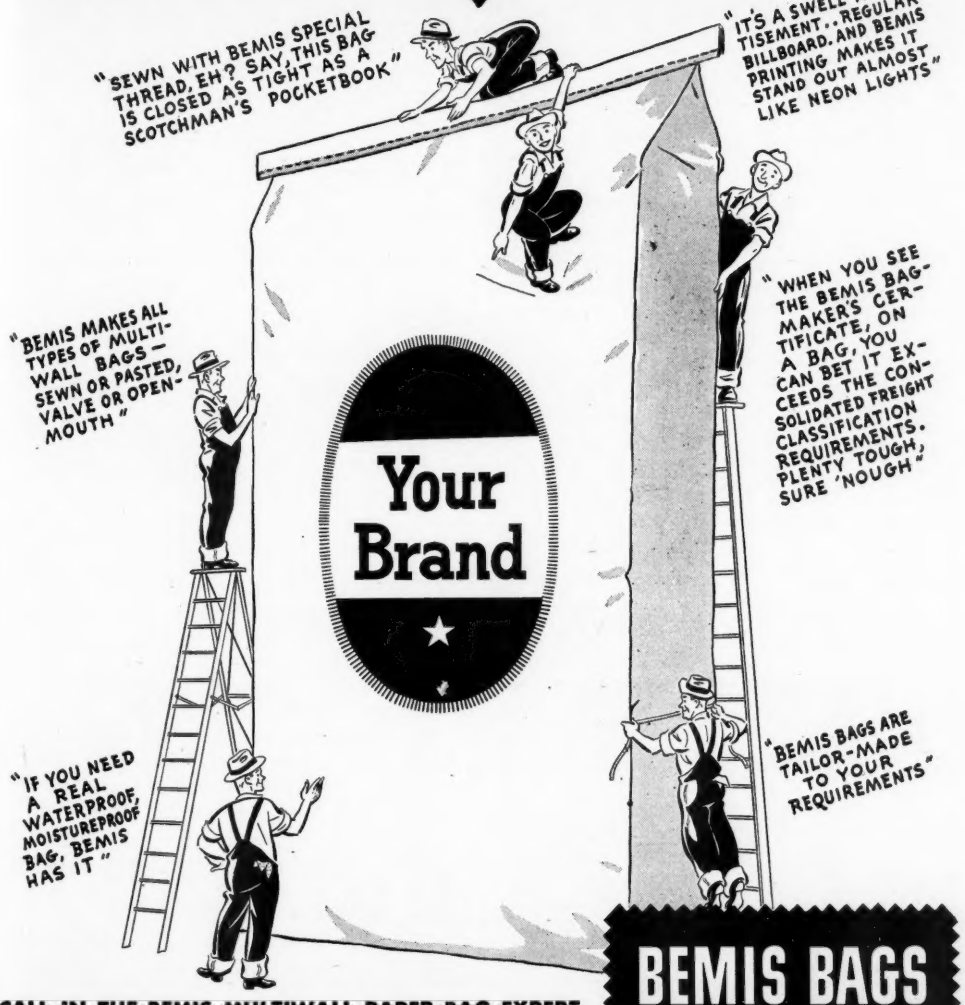
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North American Deliveries of Potash Salts

The American Potash Institute announces that deliveries of agricultural potash within the continental United States, Canada, Cuba, Puerto Rico, and Hawaii by the five major producing companies during the fourth quarter of the calendar year 1943 amounted to 167,208 tons of actual K_2O, contained in 332,691 tons of potash salts. Constituting this total were 227,259 tons of muriate, 69,013 tons of manure salts, and 36,419 tons of sulphates. In addition, deliveries for chemical uses amounted to 40,453 tons of salts, equivalent to 23,958 tons of K_2O. These figures include salts of domestic origin only.

For the calendar year 1943, deliveries of agricultural K_2O amounted to 626,334 tons, contained in 1,232,918 tons of potash salts, consisting of 883,620 tons muriate; 213,751 tons manure salts; and 135,547 tons sulphates. In addition, deliveries for chemical uses amounted to 136,824 tons of salts, equivalent to 84,367 tons K_2O.

POTASH DELIVERIES
(Short Tons K_2O)

	Calendar Year 1943	Calendar Year 1942	Oct.-Dec. 1943
United States:			
Muriate 60%.....	431,176	415,935	113,827
50%.....	48,420	40,780	13,531
Manure Salts.....	49,006	40,068	16,546
Sulphate and Sul. Pot.-Mag.....	45,731	42,140	12,753
Total Agricultural...	574,333	538,923	156,657
Canada.....	33,377	34,409	10,217
Cuba.....	1,747	3,546	217
Puerto Rico.....	11,889	7,241	25
Hawaii.....	4,988	12,192	92
Total Agricultural...	626,334	596,311	167,208
Chemical Potash.....	84,367	63,844	23,958
Grand Total.....	710,701	660,155	191,166

Chile Builds a New Mechanized Nitrate Plant

At a cost which probably will not exceed $12,000,000, construction of a new Chilean nitrate plant is now pushing rapidly ahead and will be completed well in advance of the 1944–45 season. Fully mechanized, the new plant is being built by the Tarapaca and Antofagasta Nitrate Company of Santiago and at the outset will have an annual capacity of 200,000 tons. As soon as priorities can be obtained to permit procurement of additional material and equipment, the plant's capacity may be increased to something over 300,000 tons.

In a recent message from the Tarapaca management, it is stated that "construction of the plant under the very difficult conditions imposed by the war was possible only because we were able to obtain in the United States much of the necessary equipment and material and we are grateful to the American government for its helpful cooperation in this respect."

It is interesting to note, in this connection, that the remarkably low construction cost is due to the salvage of machinery and materials from existing plants and their successful adaptation in the design of the new plant.

Assuming an average annual production of 300,000 tons, there is sufficient nitrate ore in the Company's own ground to last twenty-five years and fiscal reserves in the immediate vicinity will extend the life of the plant another twenty-five years. In addition, within a radius of ten miles, there are fiscal deposits containing more than 70,000,000 tons of nitrate.

While the mining and refining processes to be used in the operation of the new plant are identical with those employed in the two big American-owned plants, the product will be a crystal instead of the familiar Champion pellet. In appearance, mechanical condition, storage, shipping and distributing qualities, it is believed that the new product will demonstrate a high degree of perfection and will be as enthusiastically received by the trade as the granulated type. Sample lots in standard bags, stored four years in waterside warehouses, showed no physical or chemical deterioration. It will have the same nitrogen and moisture content as Champion nitrate.

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Agricultural authorities have shown that a lack of Boron in the soil can result in deficiency diseases which seriously impair the yield and quality of crops.

When Boron deficiencies are found, follow the recommendations of local County Agents or State Experiment Stations.

Information and references available on request.

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122 East 42nd ST., NEW YORK CITY
Pioneer Producers of Muriate of Potash in America

See Page 4

War Bond Facts and Figures

The Fifth War Loan will begin June 12th, closing July 8th.

The goal will be $16,000,000,000, of which six billions will be sought from individual investors.

A strong patriotic appeal, tempered with a self-interest feature, will be found in all Treasury copy. It will seek to impress upon *everybody* the need for *everybody's* cooperation over and above any other buying he is doing or has done in this war.

More than 55,000,000 Americans own at least one War Bond. That's an average of better than 1½ Bond owners for every U. S. family.

Total sales in the four War Loan drives, plus the sales of savings bonds, aggregate more than 87 billion dollars. Three weeks after Pearl Harbor it was only 2½ billions.

Individual investors purchased 32½ billions of the total—13 times more than their holdings in December, 1941.

Single "E" Bonds sold—separate pieces of paper—total more than 500,000,000. That's a 38-time increase since Pearl Harbor. A half-billion "E" Bonds laid side by side would girdle the globe 2½ times. Placed one on top of the other, they would make a pile 39½ miles high.

Sales of $25 Bonds alone have jumped to 346 million pieces. That's 69 times the number of dollar bills now in circulation.

Twenty-seven million Americans are now putting almost ten cents of every dollar they make into War Bonds every pay day. They're plowing back into the war effort 475 million dollars a month.

During the War Loan drives more than 5,000,000 unpaid volunteers ring doorbells and pound pavements to get their sales.

You can buy War Bonds or War Stamps in any one of one million places during the Fifth War Loan drive.

More "E" Bonds—the smaller ones for the small investors—were sold in the Fourth War Loan than ever before—69,900,000 individual transactions that brought in $3,187,000,000.

To reach this total, sales of "E" Bonds averaged $63,740,000 every working day, $7,967,550 per working hour.

Putting it another way, sales of "E" Bonds during the Fourth War Loan averaged $24.56 for every man, woman and child in the nation. This was $5.35 more than the average for the Third War Loan.

Bonds are the best advertised product in history but it hasn't cost the government a cent. Private business and publications contributed the space, the time and the manpower —more than 240 million dollars' worth.

Because so many people contribute their time, office space and other assistance, War Bond sales' cost to the government is only one cent for every thirty-three dollars raised.

Of every $100 Americans saved in 1943, they loaned forty-four to the government to help pay for the war.

Fertilizer for Potatoes in New York

Cornell Extension Bulletin No. 551 emphasizes correctly balanced fertilizers and methods of application. "Formerly a 1–2–1 ratio was applied to potatoes on silt loam, loam, or other heavy soils. Recent experiments indicate that in most areas in upstate New York this is not the best ratio for potatoes, as it is deficient in potash . . . In widely separated counties highest yields are obtained from the use of from 100 to 180 lbs. of potash to the acre. This is equivalent to the amount of potash in from 1,000 to 1,800 lbs. of a 5–10–10 fertilizer. In some situations higher yields are

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obtained economically with the applications of potash up to 225 lbs. to the acre, usually applied in a 1–2–3 ratio of fertilizer such as 4–8–12 . . . Most modern planters apply fertilizer in two narrow bands about 2 inches on each side and slightly below the level of the seed piece . . . Where large applications (1,200 or more lbs. single strength fertilizer) are to be made, higher yields may be obtained by broadcasting a portion of the fertilizer, plowing it under, and applying the remainder in bands through the planter. High yields have been obtained by applying fertilizer in high-low rather than in equal depth bands."

More Fertilizer For Feed Grains

Because of the shortage of feed, farmers are advised by Dr. T. B. Hutcheson, of Virginia, to use 300 to 500 pounds of 3–12–6 or 4–12–4 fertilizer at planting time on corn and side-dress with the equivalent of 125–150 pounds of nitrate of soda per acre. The corn average during the past seven years at Holland, Va., where crimson clover was turned under each year, has been 38.5 bushels to the acre, and where 200 pounds of nitrate of soda were applied as additional side-dressing, 55.8 bushels to the acre. At Williamsburg during the past four years the average increase for the use of the same amount of nitrogen has been 11.5 bushels of corn per acre.

A Comparison of Colloidal Phosphate, Rock Phosphate and Superphosphate as Sources of Phosphorous for Potato Fertilizer in Aroostook County, Maine

(Continued from page 7)

nitrogen-potash fertilizer, resulted in a serious drop in yield.

2. The use of either colloidal phosphate or rock phosphate in some of the trials resulted in reductions in yield, in comparison with superphosphate, as great as those resulting when phosphorus was omitted from the fertilizer.
3. Colloidal phosphate in these field studies on potatoes was but little more effective than finely ground rock phosphate.
4. Superphosphate proved to be a more efficient source of phosphorus than either of the less available phosphates, in that its use resulted in larger yields, probably induced by thriftier vine development (see Fig. 1). The results of this study suggest in some measure the futility of attempting to grow potatoes, certainly under Aroostook County soil conditions, without phosphorus in the fertilizer, or without employing an available phosphorus source, such as superphosphate, treble superphosphate, or ammonium phosphate, in the potato fertilizer.

PASTURE NOTES

(Continued from page 13)

pounds of nitrogen on hay-type grass sod; and 30 to 40 pounds of nitrogen as side dressing for corn where no manure has been used or nitrogen plowed under, assuming other good management and fertilization practices. To improve permanent pasture not previously treated, add 20 to 25 pounds of nitrogen plus 400 to 500 pounds of 0–20–0 or 0–14–7 per acre.—*Ohio Ext. Bul. No. 248.*

Rhode Island

Good Pastures—More Milk.—One of the big answers to the feed situation is pasture—good pasture. Liberally fertilized permanent pasture will produce from 5 to 6 times as much milk per acre as the unfertilized areas, states R. S. Shaw, extension agronomist. From 600 to 800 pounds per acre of a 7–7–7 complete fertilizer, or its equivalent, is suggested for early use on permanent grass pastures and later for supplementary grazing crops like millet and Sudan grass. More phosphate and potash are suggested for use with legumes.—*R. I. Mimeo Circ. No. 31.*

South Carolina

More Annual Grazing Needed.—Heavily fertilized annual grazing crops, such as oats, barley, rye, pearl millet, and Sudan grass will yield large amounts of cheap feed nutrients. Because of the high cost and scarcity of feed, summer supplementary crops should be heavily fertilized with 400 to 600 pounds per acre of a high-grade complete fertilizer. Adapted varieties of soybeans and velvetbeans are suggested for late summer grazing and hay production, in addition to Johnson grass, kudzu, and native grass fields.—*S. C. Ext. Circ. No. 255.*

West Virginia

More Nitrogen to Increase Feed Supplies.—Top-dressing good grass meadows and small-grain crops with nitrogen will help to increase feed supplies on many farms, states Dr. G. G. Pohlman, agronomist. In tests at Morgantown, 20 pounds of nitrogen as a top dressing in spring increased the yield of wheat about 12 bushels per acre and of hay ½ ton per acre. An additional 20 pounds of nitrogen yielded another 500 pounds of hay.

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the number of pounds of raw material for a desired per cent. of plant food in a ton of mixed goods—or find what per cent. of a certain plant food in a ton of fertilizer produced by a specific quantity of raw materials.

No mathematical calculations are necessary. You can find the figures in a few seconds with the aid of

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To make clearer its use, answers to such problems as the following can be quickly obtained:

How much sulphate of ammonia, containing 20 per cent. of nitrogen, would be needed to give 4½ per cent. nitrogen in the finished product?

Seven hundred and fifty pounds of tankage, containing 8 per cent. phosphoric acid are being used in a mixture. What per cent. of phosphoric acid will this supply in the finished goods?

Should the Adams' Formula Rule become soiled from handling, it may be readily cleaned with a damp cloth.

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For Alphabetical List of Advertisers, see page 33.

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Chemical Construction Corp., New York City.

ACID EGGS
Chemical Construction Corp., New York City.

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Chemical Construction Corp., New York City.
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AMMO-PHOS
American Cyanamid Co., New York City.

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Hydrocarbon Products Co., New York City.

AMMONIA LIQUOR
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
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Hydrocarbon Products Co., New York City.

AMMONIA OXIDATION UNITS
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BAGS AND BAGGING—Manufacturers
Bagpak, Inc., New York City.
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Textile Bag Mfrs. Association, Chicago, Ill.
Union Bag & Paper Corporation, New York City.

BAGS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Textile Bag Mfrs. Association, Chicago, Ill.

BAGS—Paper
Bagpak, Inc., New York City
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Union Bag & Paper Corporation, New York City.

BAGS (Waterproof)—Manufacturers
Bemis Bro. Bag Co., St. Louis, Mo.
St. Regis Paper Co., New York City.
Textile Bag Mfrs. Association, Chicago, Ill.
Union Bag & Paper Corporation, New York City.

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

BAG CLOSING MACHINES
Bagpak Inc., New York City.
St. Regis Paper Co., New York City.

BAGGING MACHINES—For Filling Sacks
Atlanta Utility Works, East Point, Ga.
Bagpak, Inc., New York City.
St. Regis Paper Co., New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

BAG PILERS
Link-Belt Company, Philadelphia, Chicago.

BEARINGS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

BELT LACING
Sackett & Sons Co., The A. J., Baltimore, Md.

BELTING—Chain
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

BELTING—Leather, Rubber, Canvas
Sackett & Sons Co., The A. J., Baltimore, Md.

BOILERS—Steam
Atlanta Utility Works, East Point, Ga.

BONE BLACK
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Huber & Company, New York City.

BONE PRODUCTS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City.
Pacific Coast Borax Co., New York City.

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Dickerson Co., The, Philadelphia, Pa.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
Keim, Samuel L., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

BUCKETS—Elevator
Link-Belt Company, Philadelphia, Chicago
Sackett & Sons Co., The A. J., Baltimore, Md
Stedman's Foundry and Mach. Works, Aurora, Ind

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

BUCKETS—For Hoists, Cranes, etc., Clam Shell, Orange Peel, Drag Line, Special; Electrically Operated and Multi Power
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.

BURNERS—Sulphur
Chemical Construction Corp., New York City.

BURNERS—Oil
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.

CABLEWAYS
Hayward Company, The, New York City.

CARBONATE OF AMMONIA
American Agricultural Chemical Co., New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.

CARS—For Moving Materials
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CARTS—Fertilizer, Standard and Roller Bearing
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

CASTINGS—Acid Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.

CASTINGS—Iron and Steel
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CEMENT—Acid-Proof
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

CHAIN DRIVES—Silent
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAINS AND SPROCKETS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHAMBERS—Acid
Chemical Construction Corp., New York City
Fairlie, Andrew M., Atlanta, Ga.

CHEMICAL APPARATUS
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

CHEMICALS
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., E. I., Wilmington, Del.
Huber & Company, New York City.

CHEMICALS—Continued
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Wellmann, William E., Baltimore, Md.

CHEMICAL PLANT CONSTRUCTION
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Stillwell & Gladding, New York City.
Wiley & Company, Baltimore, Md.

CLUTCHES
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

CONCENTRATORS—Sulphuric Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

CONDITIONERS AND FILLERS
American Limestone Co., Knoxville, Tenn
Dickerson Co., The, Philadelphia, Pa.
Phosphate Mining Co., The, New York City

CONTACT ACID PLANTS
Chemical Construction Corp., New York City

COPPER SULPHATE
Tennessee Corporation, Atlanta, Ga.

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

CRANES AND DERRICKS
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

CYANAMID
American Agricultural Chemical Co., New York City
American Cyanamid Co., New York City.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Jett, Joseph C., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

DENS—Superphosphate
Chemical Construction Corp., New York City.
Stedman's Foundry and Mach. Works, Aurora, Ind.

Andrew M. Fairlie
CHEMICAL ENGINEER
22 Marietta Street Building ATLANTA, GA.
CABLE ADDRESS: "SULFACID ATLANTA"

SULPHURIC Acid Plants . . . Design, Construction, Equipment . . . Operation . . . Mills-Packard Water-Cooled Acid Chambers, Gaillard Acid-Cooled Chambers, Gaillard Acid Dispersers, Contact Process Sulphuric Acid Plants.

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

DISINTEGRATORS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind

DRYERS—Direct Heat
Sackett & Sons Co., The A. J., Baltimore, Md.

DRIVES—Electric
Link-Belt Company, Philadelphia, Chicago

DUMP CARS
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

DUST COLLECTING SYSTEMS
Sackett & Sons Co., The A. J., Baltimore, Md.

ELECTRIC MOTORS AND APPLIANCES
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

ELEVATORS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ELEVATORS AND CONVEYORS—Portable
Link-Belt Company, Philadelphia, Chicago,
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

ENGINES—Steam
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

EXCAVATORS AND DREDGES—Drag Line and Cableway
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Link Belt Speeder Corp., Chicago, Ill., and Cedar Rapids, Iowa.

FERTILIZER MANUFACTURERS
American Agricultural Chemical Co., New York City.
American Cyanamid Company, New York City.
Armour Fertilizer Works, Atlanta, Ga.
Farmers Fertilizer Company, Columbus, Ohio.
International Minerals and Chemical Corporation, Chicago, Ill.
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Wellmann, William E., Baltimore, Md.

FOUNDERS AND MACHINISTS
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GARBAGE TANKAGE
Wellmann, William E., Baltimore, Md.

GEARS—Machine Moulded and Cut
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

GEARS—Silent
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

GELATINE AND GLUE
American Agricultural Chemical Co., New York City.

GUANO
Baker & Bro., H. J., New York City.

HOISTS—Electric, Floor and Cage Operated, Portable
Hayward Company, The, New York City.

HOPPERS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Wellmann, William E., Baltimore, Md.

IRON SULPHATE
Tennessee Corporation, Atlanta, Ga.

INSECTICIDES
American Agricultural Chemical Co., New York City.

LACING—Belt
Sackett & Sons Co., The A. J., Baltimore, Md.

LIMESTONE
American Agricultural Chemical Co., New York City.
American Limestone Co., Knoxville, Tenn.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C
Wellmann, William E., Baltimore, Md.

LOADERS—Car and Wagon, for Fertilizers
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.
Duriron Co., Inc., The, Dayton, Ohio.
Fairlie, Andrew M., Atlanta, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Coal and Ash Handling
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Elevating and Conveying
Atlanta Utility Works, East Point, Ga.
Hayward Company, The, New York City.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

MACHINERY—Power Transmission
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MACHINERY—Pumping
Atlanta Utility Works, East Point, Ga.
Duriron Co., Inc., The, Dayton, Ohio.

MACHINERY—Tankage and Fish Scrap
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MAGNETS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

NITRATE OF SODA
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
Chilean Nitrate Sales Corp., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

NITRATE OVENS AND APPARATUS
Chemical Construction Corp., New York City.

NITROGEN SOLUTIONS
Barrett Division, The, Allied Chemical & Dye Corp., New York City.

NITROGENOUS ORGANIC MATERIAL
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
DuPont de Nemours & Co., Wilmington, Del.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Smith-Rowland Co., Norfolk, Va.
Wellmann, William E., Baltimore, Md.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.

PACKING—For Acid Towers
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Chemical Construction Corp., New York City.

PANS AND POTS
Stedman's Foundry and Mach. Works, Aurora, Ind.

PHOSPHATE MINING PLANTS
Chemical Construction Corp., New York City.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City.
American Cyanamid Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Coronet Phosphate Co., New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Phosphate Mining Co., The, New York City.
Ruhm, H. D., Mount Pleasant, Tenn.
Schmaltz, Jos. H., Chicago, Ill.
Southern Phosphate Corp., Baltimore, Md.
Virginia-Carolina Chemical Corp. (Mining Dept.), Richmond, Va.
Wellmann, William E., Baltimore, Md.

PIPE—Acid Resisting
Duriron Co., Inc., The, Dayton, Ohio.

PIPES—Chemical Stoneware
Chemical Construction Corp., New York City.

PIPES—Wooden
Stedman's Foundry and Mach. Works, Aurora, Ind

PLANT CONSTRUCTION—Fertilizer and Acid
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

POTASH SALTS—Manufacturers
American Potash and Chem. Corp., New York City.
Potash Co. of America, New York City.
International Minerals & Chemical Corp., Chicago, Ill.
United States Potash Co., New York City.

PULLEYS AND HANGERS
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

PUMPS—Acid-Resisting
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

PYRITES—Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., New York City.
Wellmann, William E., Baltimore, Md.

QUARTZ
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

RINGS—Sulphuric Acid Tower
Chemical Construction Corp., New York City.

ROUGH AMMONIATES
Bradley & Baker, New York City.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

A Classified Index to Advertisers in "The American Fertilizer"

BUYERS' GUIDE

For an Alphabetical List of all the Advertisers, see page 33

SCALES—Including Automatic Bagging
Atlanta Utility Works, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SCRAPERS—Drag
Hayward Company, The, New York City.

SCREENS
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SEPARATORS—Air
Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Including Vibrating
Sackett & Sons Co., The A. J., Baltimore, Md.

SEPARATORS—Magnetic
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHAFTING
Atlanta Utility Works, East Point, Ga.
Link-Belt Company, Philadelphia, Chicago.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman's Foundry and Mach. Works, Aurora, Ind.

SHOVELS—Power
Link-Belt Company, Philadelphia, Chicago.
Link-Belt Speeder Corporation, Chicago, Ill., and Cedar Rapids, Iowa.
Sackett & Sons Co., The A. J., Baltimore, Md.

SPRAYS—Acid Chambers
Monarch Mfg. Works, Inc., Philadelphia, Pa.

SPROCKET WHEELS (See Chains and Sprockets)

STACKS
Sackett & Sons Co., The A. J., Baltimore, Md.

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Barrett Division, The, Allied Chemical & Dye Corp., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
Hydrocarbon Products Co., New York City.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Wellmann, William E., Baltimore, Md.

SULPHUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Freeport Sulphur Co., New York City.
Texas Gulf Sulphur Co., New York City.

SULPHURIC ACID
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M. Charleston, S. C.

SULPHURIC ACID—Continued
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
Huber & Company, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Wellmann, William E., Baltimore, Md.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill
Phosphate Mining Co., The, New York City.
U. S. Phosphoric Products Division, Tennessee Corp Tampa, Fla.

SYPHONS—For Acid
Monarch Mfg. Works, Inc., Philadelphia, Pa.

TALLOW AND GREASE
American Agricultural Chemical Co., New York City.

TANKAGE
American Agricultural Chemical Co., New York City.
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Baker & Bro., H. J., New York City.
Bradley & Baker, New York City.
International Minerals & Chemical Corporation, Chicago, Ill.
Jett, Joseph C., Norfolk, Va.
McIver & Son, Alex. M., Charleston, S. C.
Schmaltz, Jos. H., Chicago, Ill.
Smith-Rowland, Norfolk, Va.
Wellmann, William E., Baltimore, Md.

TANKAGE—Garbage
Huber & Company, New York City.

TANKS
Sackett & Sons, Co., The A. J., Baltimore, Md.

TILE—Acid-Proof
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.

TOWERS—Acid and Absorption
Chemical Construction Corp., New York City.
Fairlie, Andrew M., Atlanta, Ga.

UNLOADERS—Car and Boat
Hayward Company, The, New York City.
Sackett & Sons Co., The A. J., Baltimore, Md.

UREA
DuPont de Nemours & Co., E. I., Wilmington, Del.

UREA-AMMONIA LIQUOR
DuPont de Nemours & Co., E. I., Wilmington, Del.

VALVES—Acid-Resisting
Atlanta Utility Works, East Point, Ga.
Charlotte Chem. Laboratories, Inc., Charlotte, N. C.
Duriron Co., Inc., The, Dayton, Ohio.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

WHEELBARROW (See Carts)

ZINC SULPHATE
Tennessee Corporation, Atlanta, Ga.

ALPHABETICAL LIST OF ADVERTISERS

For Classified Index, see pages 28 to 32, inclusive

American Agricultural Chemical Co., New York City..... 3
American Cyanamid Co., New York City.—
American Limestone Co., Knoxville, Tenn..20
American Potash and Chemical Corp., New York City.....4, 23
Armour Fertilizer Works, Atlanta, Ga.....18
Ashcraft-Wilkinson Co., Atlanta, Ga. Front Cover
Atlanta Utility Works, East Point, Ga....—

Bagpak, Inc., New York City.....2nd Cover
Baker & Bro., H. J., New York City.....—
Barrett Division, Allied Chemical & Dye Corporation, New York City.....—
Bemis Bro. Bag Co., St. Louis, Mo.....21
Bradley & Baker, New York City.....16

Charlotte Chemical Lab., Charlotte, N. C.—
Chemical Construction Corp., New York City.....23
Chilean Nitrate Educational Bureau, New York City.....34

Dickerson Co., The, Philadelphia, Pa.....—
Dougherty, Jr., E., Philadelphia, Pa.....—
Du Pont de Nemours & Co., E. I., Wilmington, Del.....33
Duriron Company, Dayton, Ohio.....—

Fairlie, Andrew M., Atlanta, Ga.....29
Farmers Fertilizer Co., Columbus, Ohio...34
Freeport Sulphur Co., New York City....—

Gascoyne & Co., Inc., Baltimore, Md.....34

Hayward Company, The, New York City..34
Huber Co., L. W., New York City.....—
Hydrocarbon Products Co., New York City.19

International Minerals & Chemical Corporation, Chicago, Ill.....—

Jeffrey Manufacturing Co., The, Columbus, Ohio.....—
Jett, Joseph C., Norfolk, Va.....—

Keim, Samuel D., Philadelphia, Pa.....33

Link-Belt Company, Chicago, Ill.....—

McIver & Son, Alex. M., Charleston, S. C..25

Monarch Mfg. Works, Inc., Philadelphia, Pa.....34

Pacific Coast Borax Co., New York City..—
Phosphate Mining Co., The, New York City..... 4
Polk Co., R. L., Detroit, Mich.....—
Potash Co. of America, New York City. 3rd Cover

Ruhm, H. D., Columbia, Tenn.....34

Sackett & Sons Co., The A. J., Baltimore, Md.....—
Schmaltz, Jos. H., Chicago, Ill.....34
Shuey & Company, Inc., Savannah, Ga...34
Smith-Rowland Co., Norfolk, Va.....—
Southern Phosphate Corp., New York City..24
Stedman's Foundry and Machine Works, Aurora, Ind.....22
Stillwell & Gladding, New York City.....34
St. Regis Paper Co., New York City Back Cover
Synthetic Nitrogen Products Co., New York City.....—

Tennessee Corporation, Atlanta, Ga.....—
Texas Gulf Sulphur Co., New York City..25
Textile Bag Mfrs. Association, Chicago, Ill..—

Union Bag & Paper Corp., New York City.—
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.....23
United States Potash Co., New York City

Virginia-Carolina Chemical Corp., Mining Dept., Richmond, Va.....—

Wellmann, William E., Baltimore, Md....25
Wiley & Company, Inc., Baltimore, Md...34

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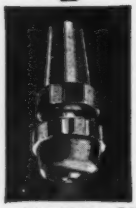

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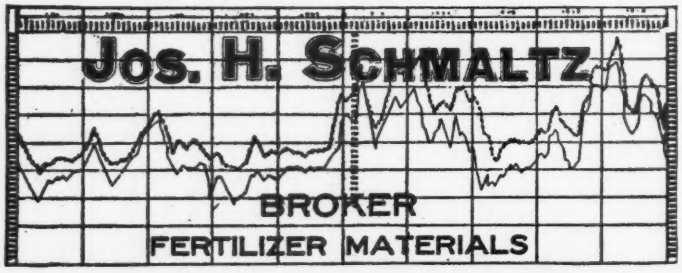

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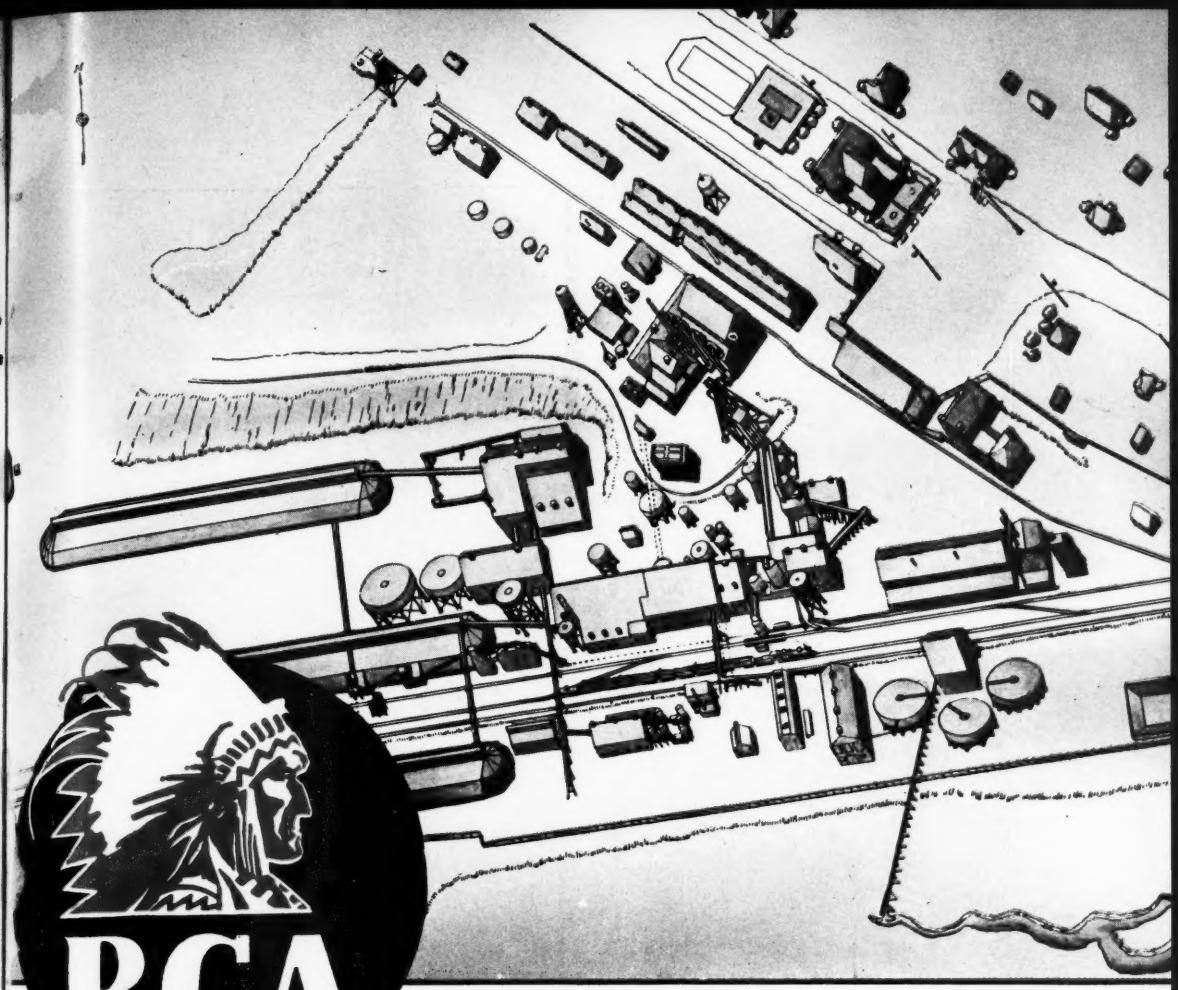

Above is a bird's eye view of the plant at Carlsbad, N. M. where Potash Company of America mines and refines its products.

And at left is the Red Indian trade-mark of Potash Company of America which identifies Potash products of uniformly high quality.

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